



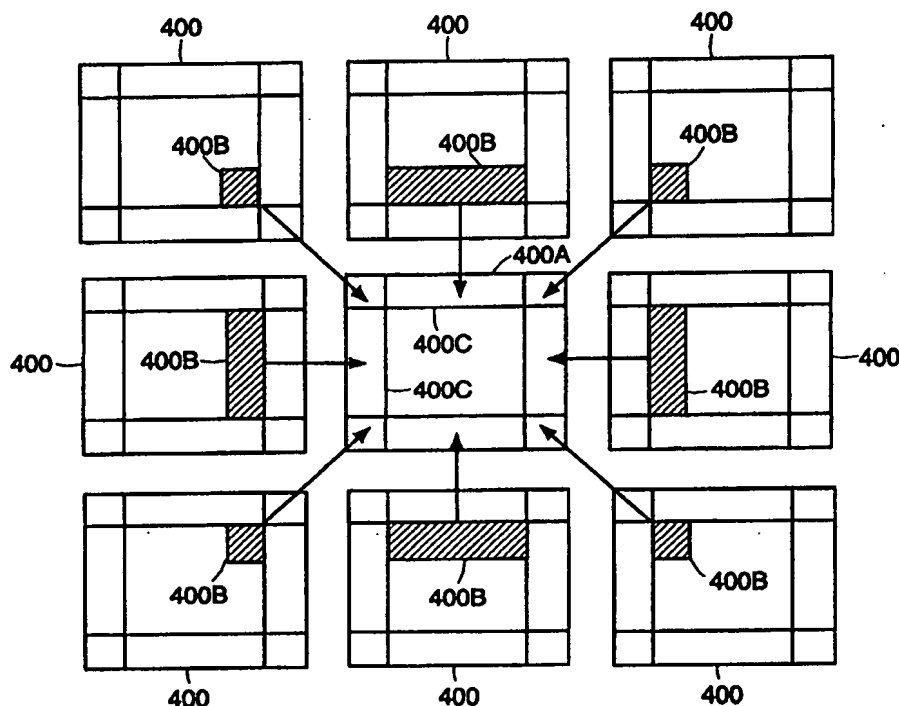
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : H04N 7/26		A3	(11) International Publication Number: WO 99/38316
			(43) International Publication Date: 29 July 1999 (29.07.99)
(21) International Application Number: PCT/US99/01410		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 21 January 1999 (21.01.99)			
(30) Priority Data: 60/072,436 26 January 1998 (26.01.98) US 09/054,427 3 April 1998 (03.04.98) US			
(71) Applicant: TIERNAN COMMUNICATIONS, INC. [US/US]; 5751 Copley Drive, San Diego, CA 92111 (US).			
(72) Inventor: HU, Yendo; 3950 Mahaila Avenue, No. A35, San Diego, CA 92122 (US).			
(74) Agents: SMITH, James, M. et al.; Hamilton, Brook, Smith & Reynolds, P.C., Two Militia Drive, Lexington, MA 02421 (US).		Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>	
		(88) Date of publication of the international search report: 20 January 2000 (20.01.00)	

(54) Title: METHOD AND APPARATUS FOR ADVANCED TELEVISION SIGNAL ENCODING AND DECODING

(57) Abstract

The specification discloses a method and apparatus for encoding and decoding advanced television signals using standard MPEG-2 compression engines while maintaining the compression efficiency of such compression engines. The architecture provides parallel processing using standard MPEG-2 compression engines in an overlapping arrangement that does not sacrifice compression performance. A video encoder includes plural regional processors for encoding an input stream of video images. Each video image is divided into regions that have overlapping portions, with each processor encoding a particular region of a current video image in the stream. The regional processors each store a reference frame in a local memory based on a prior video image in the stream for use in the motion compensation of the encoding process. A reference frame processor coupled to the plural local memories updates each reference frame with information from reference frames stored in adjacent local memories. The encoded video images are made up of macroblocks and each regional processor includes means for removing certain macroblocks from the encoded video images that correspond to the overlap portions and concatenating the resulting



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INTERNATIONAL SEARCH REPORT

International Application No

CT/US 99/01410

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04N7/26

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	<p>US 5 701 160 A (KIMURA JUNICHI ET AL) 23 December 1997 (1997-12-23) column 7, line 23 - line 40</p> <p>column 8, line 28 - line 50 column 11, line 18 - line 30 column 12, line 30 - line 53 column 36, line 37 - column 37, line 54 --- -/--</p>	<p>21,25</p> <p>1-3,8,9, 13,15, 16,19,20</p>



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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Date of the actual completion of the international search

15 November 1999

Date of mailing of the international search report

23/11/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Marie-Julie, J-M

INTERNATIONAL SEARCH REPORT

International Application No

CT/US 99/01410

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	EP 0 577 310 A (CANON KK) 5 January 1994 (1994-01-05) page 2, column 2, line 17 - line 30 page 6, column 9, line 46 -page 7, column 12, line 10 page 7, column 12, line 11 -page 9, column 15, line 26 ----	21,25 1-3, 5-13, 15-20, 22-24, 26,27
A	US 5 461 679 A (CHU KE-CHIANG ET AL) 24 October 1995 (1995-10-24) column 9, line 59 -column 10, line 2 column 11, line 50 -column 12, line 34 ----	1-3,8,9, 13,15, 16,19,20
X	CHALLAPALI K ET AL: "GRAND ALLIANCE MPEG-2-BASED VIDEO DECODER WITH PARALLEL PROCESSING ARCHITECTURE" INTERNATIONAL JOURNAL OF IMAGING SYSTEMS AND TECHNOLOGY,US,WILEY AND SONS, NEW YORK, vol. 5, no. 4, 1 January 1994 (1994-01-01), page 263-267 XP000565047 ISSN: 0899-9457	21,25
A	paragraphs '0111!-'000B!-'0002! ----	22-24, 26,27
A	MAILHOT J N: "THE GRAND ALLIANCE HDTV VIDEO ENCODER" INTERNATIONAL CONFERENCE ON CONSUMER ELECTRONICS - DIGEST OF TECHNICALPAPERS,US,NEW YORK, IEEE, vol. CONF. 14, 7 June 1995 (1995-06-07), page 300-301 XP000547830 ISBN: 0-7803-2141-3 the whole document -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/01410

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5701160 A	23-12-1997	JP 8037662 A CN 1119386 A	06-02-1996 27-03-1996
EP 0577310 A	05-01-1994	JP 6022297 A JP 6205398 A US 5774592 A	28-01-1994 22-07-1994 30-06-1998
US 5461679 A	24-10-1995	US 5212742 A JP 6030442 A	18-05-1993 04-02-1994